

STORM WATER QUALITY REPORT

MONTECITO COUNTRY CLUB

Santa Barbara, California

February 14th, 2009

CLIENT:	Ty Warner Hotels and Resort
PREPARED BY:	Penfield & Smith 111 East Victoria Street Santa Barbara, California 93101 (805) 963-9532
WORK ORDER NO.:	18058.01
PROJECT MANAGER:	Jeremy Salts, P.E.

INTRODUCTION

The Montecito Country Club and Golf Course (MCC) are located in the City of Santa Barbara, north of Highway 101 and the Andree Clark Bird Refuge. It is bordered on the south by Old Coast Highway, on the east by Hot Springs Road, and by existing residential development on the north and west.

The property consists of approximately 112 acres and is located within the Andree Clark Bird Refuge watershed. The MCC has an off-site tributary area of approximately 258 acres of primarily residential property.

MCC owners are proposing a project to redesign the golf course, which will require site grading and associated drainage improvements. Other improvements included in the proposed project include the demolition and relocation of four tennis courts, the golf course maintenance building and golf cart barn building, as well as removal and construction of various driveway and parking lot facilities.

PURPOSE OF REPORT

The purpose of this report is to evaluate the existing state of storm water quality at the site, including identification of pollutants and their sources. Best Management Practices and other methods of treating storm water runoff from the site to reduce pollutant loads as much as is practical will also be proposed.

METHOD OF ANALYSIS

Existing drainage facilities and tributary areas were mapped based on aerial topography, field topography and City and County records. Preliminary Grading and Drainage Plans were used as the basis for the proposed condition analysis.

The computer program HydroCAD v.8.0, which utilizes the Santa Barbara Urban Hydrograph model, as described in the Santa Barbara County Engineering Design Manual, was used to model a storm event equal to one inch of precipitation on the project site for the purpose of water quality treatment facility sizing.

The Preliminary Drainage Report prepared for the project can be referenced for more detailed hydrologic information.

FINDINGS

Existing Conditions

The MCC does not have a significant negative impact on storm water quality in its existing state. The golf course itself is well managed, avoiding surface water polluting activities such as over-fertilizing and over-watering.

The primary source of pollutants generated on-site is from existing asphalt parking lots and driveways. These surfaces may contribute heavy metals, trash, debris, oil and grease to stormwater runoff. However, many of the pollutant concentrations are reduced as the runoff is filtered through soil and vegetation in the golf course prior to leaving the site.

Most of the storm water pollutants leaving the MCC property likely originated upstream from the project in the existing residential neighborhoods. Runoff from residential neighborhoods often contains nutrients, pesticides, sediments, trash and debris, oxygen demanding substances, oil and grease.

Currently, the off-site pollutants pass through the MCC property quickly in an extensive network of pipes, with little opportunity to be filtered through vegetation or for sedimentation to occur.

Proposed Conditions

The proposed MCC project will be designed to have a significant positive impact on the watershed and the environment from a storm water management perspective. The proposed design will decrease the total percentage of impervious area within the project boundary to ensure that there is a decrease in storm water runoff peak flows and volume.

All flows generated on-site or passing through the project property will be routed through sedimentation basins, vegetated creeks and ponds, vegetated swales or a combination of those items prior to leaving the site. There are no direct pipe to pipe connections proposed from the project site to downstream storm drains.

Sedimentation/infiltration basins have been proposed at the upstream end of the site to capture sediment from stormwater entering the project. These basins have been located to intercept the two largest concentration points entering the site to gain the maximum benefit. The basins will promote sedimentation and will allow for infiltration of storm water into the soil. After treatment, storm water can continue its route through the project property.

The City of Santa Barbara Storm Water Management Program recommends that a 1” storm be used to size volumetric based Best Management Practices. The runoff generated during a 1” storm event on the subject site is 0.41 acre-feet. The two sedimentation/infiltration basins proposed for this project create a storage volume of approximately 0.89 acre-feet, more than double the City requirement.

The existing network of subsurface storm drain pipes routes off-site runoff through the project site very rapidly. The proposed MCC improvements include the removal of many of these pipes. This will create two large, open drainage channels which will return the drainage pattern within the site to a more natural state. This approach was utilized everywhere practical, but was not used in areas that are too steep to sustain open channel flow without erosion and in areas where it would have had a significant detrimental effect on the play of the golf course.

Vegetated swales will be used throughout the site in key locations. Polluted storm water runoff entering the site from Rametto Road will be intercepted with a rock rip-rap energy dissipator and routed through a vegetated swale to the easterly sedimentation basin. Stormwater runoff from other impervious surfaces will also be routed through vegetation and soil prior to leaving the site. If this is not feasible in some locations due to site constraints, catch basin filter inserts will be used to treat runoff from impervious surfaces at the source.

At the southerly end of the site, two permanent ponds are proposed to be constructed. The majority of runoff passing through the site will be intercepted in these two ponds prior to entering the storm drain system under Old Coast Highway. The ponds are intended to have buried HDPE liners to limit infiltration losses, and will have natural soil cover over the liners to support aquatic vegetation and natural biologic processes. The upstream sedimentation/infiltration basins will limit the quantity of suspended solids reaching the permanent ponds, reducing required maintenance.

CONCLUSIONS AND RECOMMENDATIONS

If the MCC improvement project is constructed as proposed, it will reduce total storm water runoff from the site and will have a significant positive impact on the Andree Clark Bird Refuge watershed.

CALCULATIONS AND ATTACHMENTS

DRAINAGE CALCULATIONS

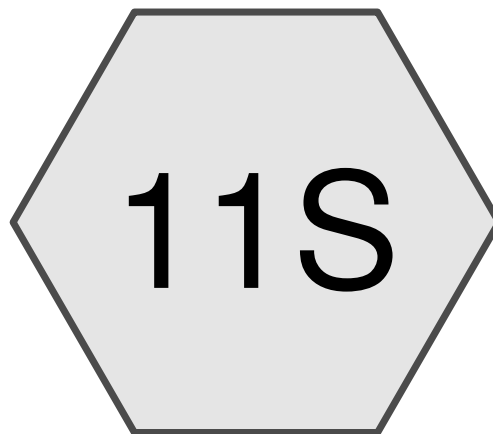
Sub-Area Diagram

1" Storm Event Over Project Site

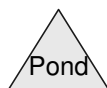
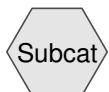
HydroCAD Input Data

STORM WATER QUALITY EXHIBIT

EXISTING HYDROLOGY MAP



MCC Property



Drainage Diagram for 18058_01

Prepared by Penfield & Smith 1/18/2008

HydroCAD® 8.00 s/n 004468 © 2006 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

<u>Area (acres)</u>	<u>CN</u>	<u>Description (subcats)</u>
111.490	74	>75% Grass cover, Good, HSG C (11S)
5.910	94	Urban commercial, 85% imp, HSG C (11S)
<hr/>		
117.400		

18058_01

Type I 24-hr 1" Rainfall Rainfall=1.00"

Prepared by Penfield & Smith

Page 3

HydroCAD® 8.00 s/n 004468 © 2006 HydroCAD Software Solutions LLC

1/18/2008

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 11S: MCC Property

Runoff Area=117.400 ac Runoff Depth>0.04"

Flow Length=1,560' Tc=19.1 min CN=74/98 Runoff=1.81 cfs 0.421 af

Total Runoff Area = 117.400 ac Runoff Volume = 0.421 af Average Runoff Depth = 0.04"

95.72% Pervious Area = 112.377 ac 4.28% Impervious Area = 5.024 ac

Subcatchment 11S: MCC Property

Runoff = 1.81 cfs @ 10.00 hrs, Volume= 0.421 af, Depth> 0.04"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type I 24-hr 1" Rainfall Rainfall=1.00"

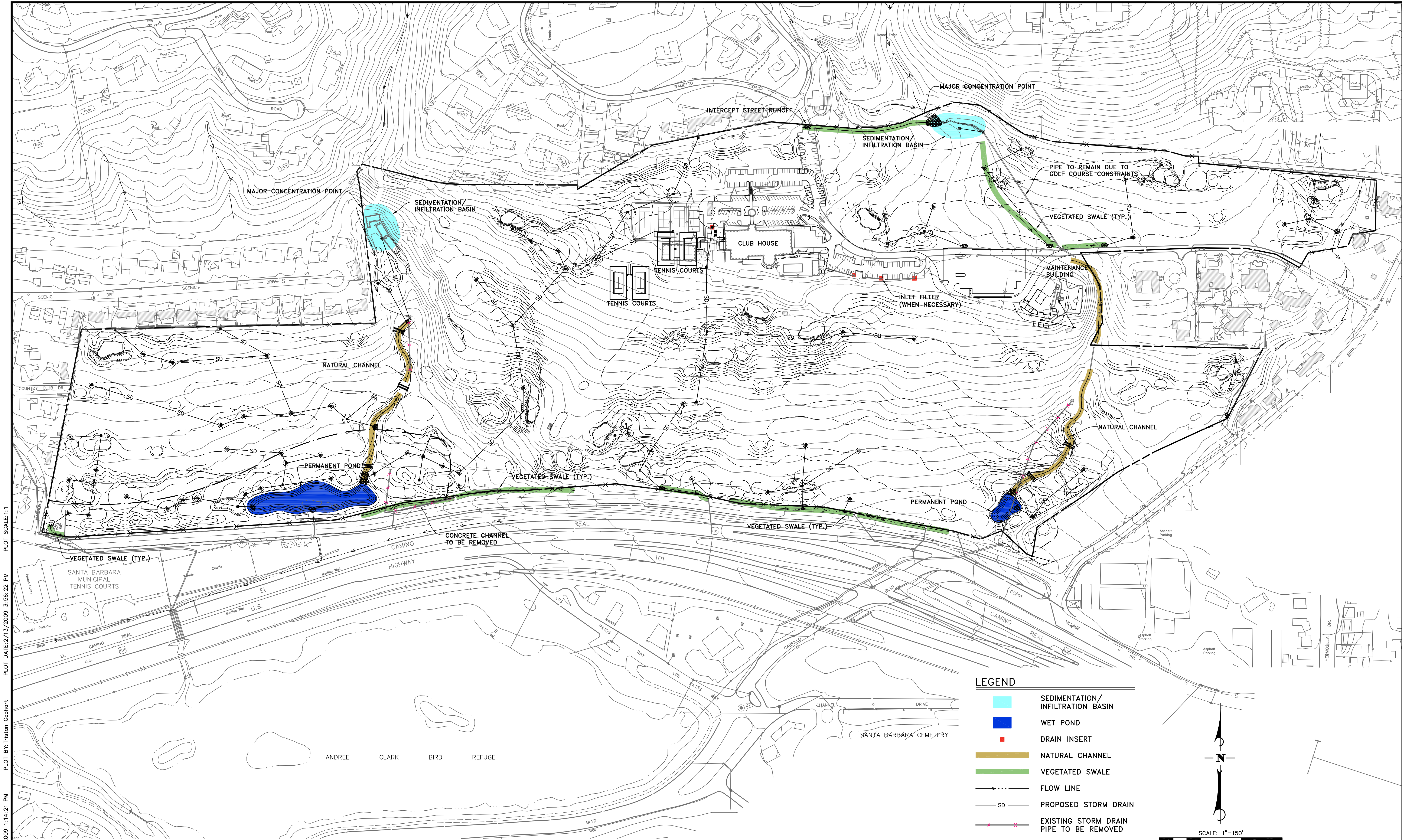
Area (ac)	CN	Description
5.910	94	Urban commercial, 85% imp, HSG C
111.490	74	>75% Grass cover, Good, HSG C
117.400	75	Weighted Average
112.377	74	Pervious Area
5.024	98	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	300	0.1500	0.33		Sheet Flow, Golf Course
					Grass: Dense n= 0.240 P2= 3.36"
4.1	1,260	0.1151	5.09		Shallow Concentrated Flow, Golf Course
					Grassed Waterway Kv= 15.0 fps
19.1	1,560	Total			

Tributary Areas - Existing Conditions

	Tributary Area - Acres										
Land Use	A	B	C	D	E	F	G	H	J	K	MCC Bdy.
1 acre residential	0	0	13.04	93.39	1.62	0	0	2.05	0	139.56	0
commercial	0	0	0	0.31	0.96	0.18	1.48	2.98	0	0	5.9
golf course	0.41	0.48	6.17	23.2	20.04	5.01	7.18	9.63	3.77	38.25	105.8
total	0.41	0.48	19.21	116.9	22.62	5.19	8.66	14.66	3.77	177.81	111.7

Flow Path of Travel for Tc Calculations - Existing Conditions						
Area	Length	Elev. 1	Elev. 2	Slope	Method	Surface
A	300	71	45	0.0867	sheet	grass
B	300	48	26	0.0733	sheet	grass
	75	26	19	0.0933	shallow	grass
C	190	326	318	0.0421	sheet	woods
	601	318	294	0.0399	shallow	paved
	427	294	198	0.2248	12" RCP	
	552	198	83	0.2083	shallow	woods
	241	83	67	0.0664	18" RCP	
	802	67	14	0.0661	shallow	grass
D	300	514	496	0.0600	sheet	paved
	3580	496	41	0.1271	shallow	woods
	209	41	30	0.0526	30" RCP	
	742	30	9	0.0283	shallow	grass
E	280	236	195	0.1464	sheet	woods
	1540	195	10	0.1201	shallow	grass
F	1004	175	54	0.1205	shallow	grass
G	238	190	173	0.0714	sheet	paved
	386	173	159	0.0363	shallow	paved
	1002	159	48	0.1108	shallow	grass
H	300	220	190	0.1000	sheet	woods
	720	190	156	0.0472	shallow	paved
	1012	156	37	0.1176	shallow	grass
J	168	156	150	0.0357	sheet	fallow
	890	150	40	0.1236	shallow	grass
K	300	510	430	0.2667	sheet	woods
	659	430	326	0.1578	shallow	paved
	2475	326	145	0.0731	shallow	woods
	578	145	132	0.0225	36" RCP	
	366	132	102	0.0820	shallow	woods
	80	102	93	0.1125	30" RCP	
	138	93	78	0.1087	shallow	grass
	573	78	36	0.0733	21" RCP	
MCC Bdy.	300	200	155	0.1500	sheet	grass
	1260	155	10	0.1151	shallow	grass



36-ENG SAVE DATE: 2/12/2009 1:14:21 PM PLOT BY: Tristan Gebhart PLOT DATE: 2/13/2009 3:56:22 PM PLOT SCALE: 1:1

NO.	DATE	REVISIONS	APPD.



Penfield & Smith
Engineering · Surveying · Planning
· Construction Management ·
111 East Victoria Street, Santa Barbara, CA 93101
Phone: (805) 963-9532 Fax: (805) 966-9801

DESIGN: GGS CHECKED: _____
GUY GEREMY SALTS DATE: _____
PROJECT ENGINEER
R.C.E. 60,488 (EXP. 6/30/10)



CITY OF SANTA BARBARA

REVIEWED BY:

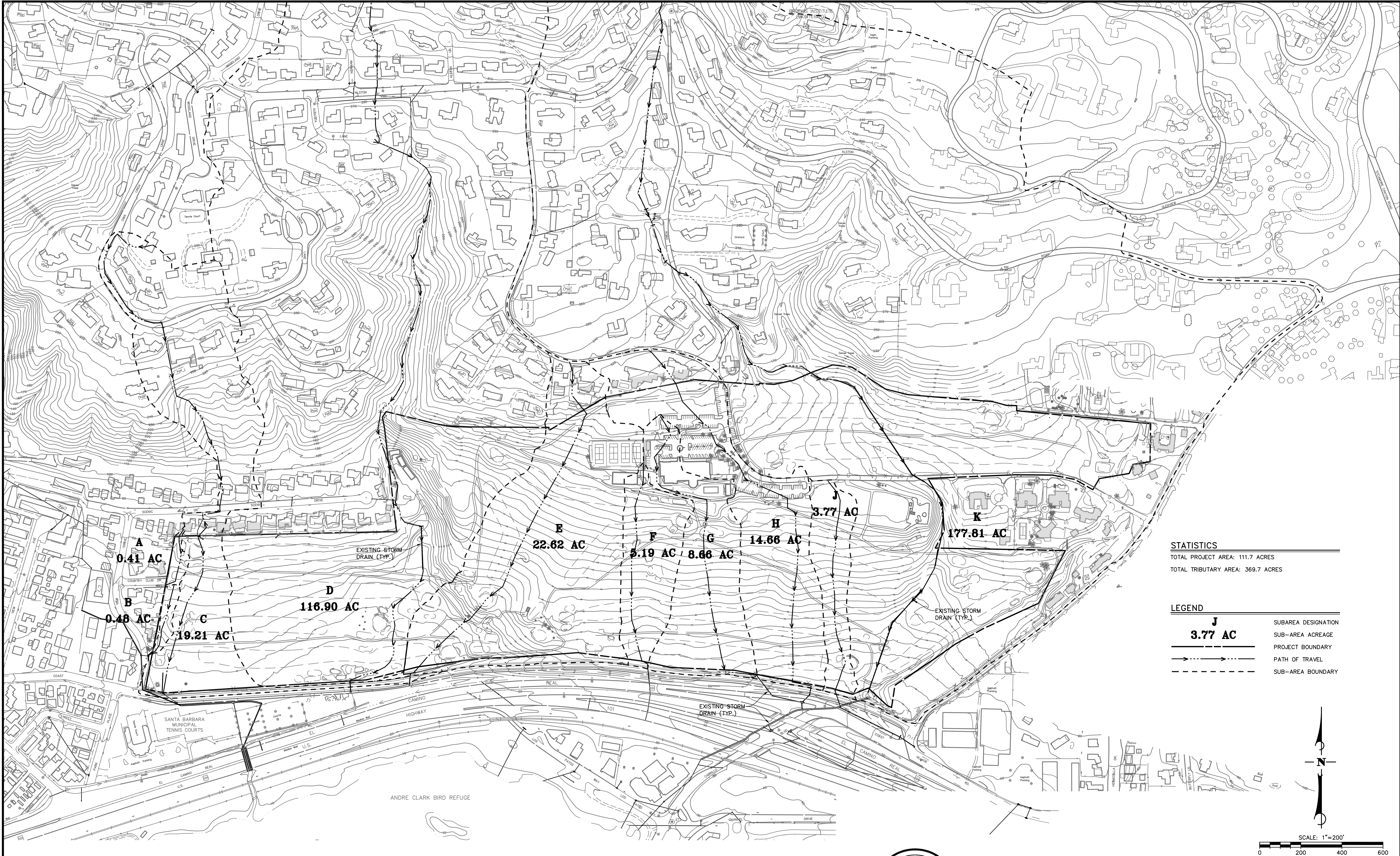
SIGNATURE _____ DATE _____

PRELIMINARY IMPROVEMENT PLANS
STORMWATER QUALITY EXHIBIT
MONTECITO COUNTRY CLUB
920 SUMMIT ROAD, SANTA BARBARA, CALIFORNIA

P&S PROJECT NO.
18058.01
SHEET
1 OF 1
PLAN DATE
02/14/09

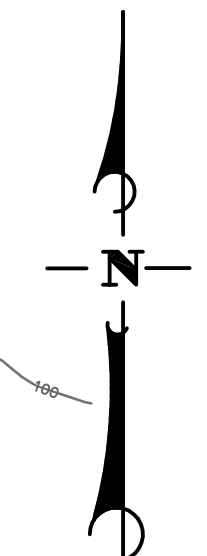
DRAWING: c:\work\18058\civil\exhibits\18058ex_sq_02.dwg

36-ENG SAVE DATE: 1/16/2009 11:06:26 AM PLOT BY:Triston Gebhart PLOT DATE:2/13/2009 3:54:44 PM PLOT SCALE:1:1



STATISTICS
TOTAL PROJECT AREA: 111.7 ACRES
TOTAL TRIBUTARY AREA: 369.7 ACRES

LEGEND
J
3.77 AC
SUBAREA DESIGNATION
SUB-AREA ACREAGE
PROJECT BOUNDARY
PATH OF TRAVEL
SUB-AREA BOUNDARY

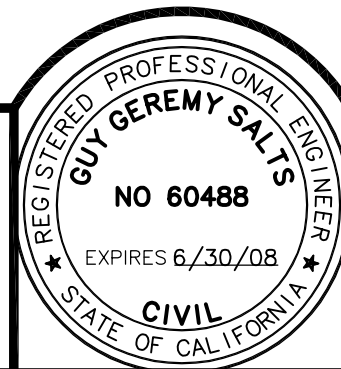


SCALE: 1"=200'
0 200 400 600

NO.	DATE	REVISIONS	APPD.

Penfield & Smith
Engineering · Surveying · Planning
· Construction Management ·
111 East Victoria Street, Santa Barbara, CA 93101
Phone: (805) 963-9532 Fax: (805) 966-9801

DESIGN_GGS _____ CHECKED _____
GUY GEREMY SALTS DATE: _____
PROJECT ENGINEER
R.C.E. 60,488 (EXP. 6/30/08)



CITY OF SANTA BARBARA

REVIEWED BY:

SIGNATURE _____ DATE _____

EXISTING HYDROLOGY MAP
MONTECITO COUNTRY CLUB
CITY OF SANTA BARBARA, CALIFORNIA

P&S PROJECT NO.
18058.01
SHEET
1 OF 1
PLAN DATE
04/25/2008

DRAWING: \\cscd\work\18058\Civil\exhibits\18058ex_hydro_01.dwg

